

PALYNOLOGICAL EVIDENCE SUPPORTING THE IDENTITY OF TWO TAXA OF *BERBERIS* (BERBERIDACEAE) FROM TIBET

ARTI GARG, TARIQ HUSAIN, and R.R. RAO

Taxonomy and Biodiversity Division
National Botanical Research Institute
Rana Pratap Marg, Lucknow - 226001
U.P., INDIA

ABSTRACT

The identity of *Berberis replicata* var. *dispar* and *B. griffithiana* var. *pallida* is supported on the basis of pollen morphology. Phylogenetically *B. replicata* was found to be a primitive, and *B. griffithiana* an advanced taxa.

RESUMEN

La identidad de *Berberis replicata* var. *dispar* y *B. griffithiana* var. *pallida* se mantiene en base a la morfología polínica. Filogenéticamente *B. replicata* es un taxon primitivo, y *B. griffithiana* uno derivado.

INTRODUCTION

In continuity of Husain et al. (1994) paper on *The identity of two taxa of Berberis (Berberidaceae) from Tibet*, the identity of *Berberis replicata* W.W. Sm. var. *dispar* Ahrendt and *B. griffithiana* Schneid. var. *pallida* (Hk.f. & Th.) Chamberlain & Hu—is discussed in the light of pollen morphological characters using light and scanning electron microscope.

MATERIAL AND METHODS

Polliniferous material for the present study was obtained in the form of dried flower buds from Herbarium sheets. The material was soaked in 70% alcohol for 48 hours and pollen was subsequently acetolysed according to the method of Erdtman (1952). One part of the acetolysed pollen was mounted on slides in glycerine jelly and observed under compound microscope while the other part was mounted on brass stub, gold coated, observed and photographed under scanning electron microscope.

RESULTS AND DISCUSSION

The morphological characters of the three taxa (distributed in Eastern Himalaya and China) namely *B. replicata* var. *dispar* (India: Arunachal

Pradesh: *T. S. Rana & Party* 210335, LWG), *B. griffithiana* var. *griffithiana* (India: Arunachal Pradesh: *T. S. Rana & Party* 210330, LWG) and *B. griffithiana* var. *pallida* (China: *Ludlow, Sheriff & Taylor* 3697, BM) are tabulated and a key for the segregation of *B. replicata* and *B. griffithiana* are provided in Husain et al. (*l. c.*) communication. The pollen morphology of these taxa is given in Table 1 and explained as follows:

Berberis replicata* var. *dispar (Figs. 1, 2)

Grains inaperturate, 2–3 colpoid streaks occur in association with irregular fissures on the exine surface. Exine 1.7 μm thick; ectoexine equal to endoexine, columella indistinct; surface psilate, ill-defined with irregular folds. Grains spheroidal; diam 45 μm (44–47 μm); tectum ill-defined.

Berberis griffithiana (Figs. 3–6)

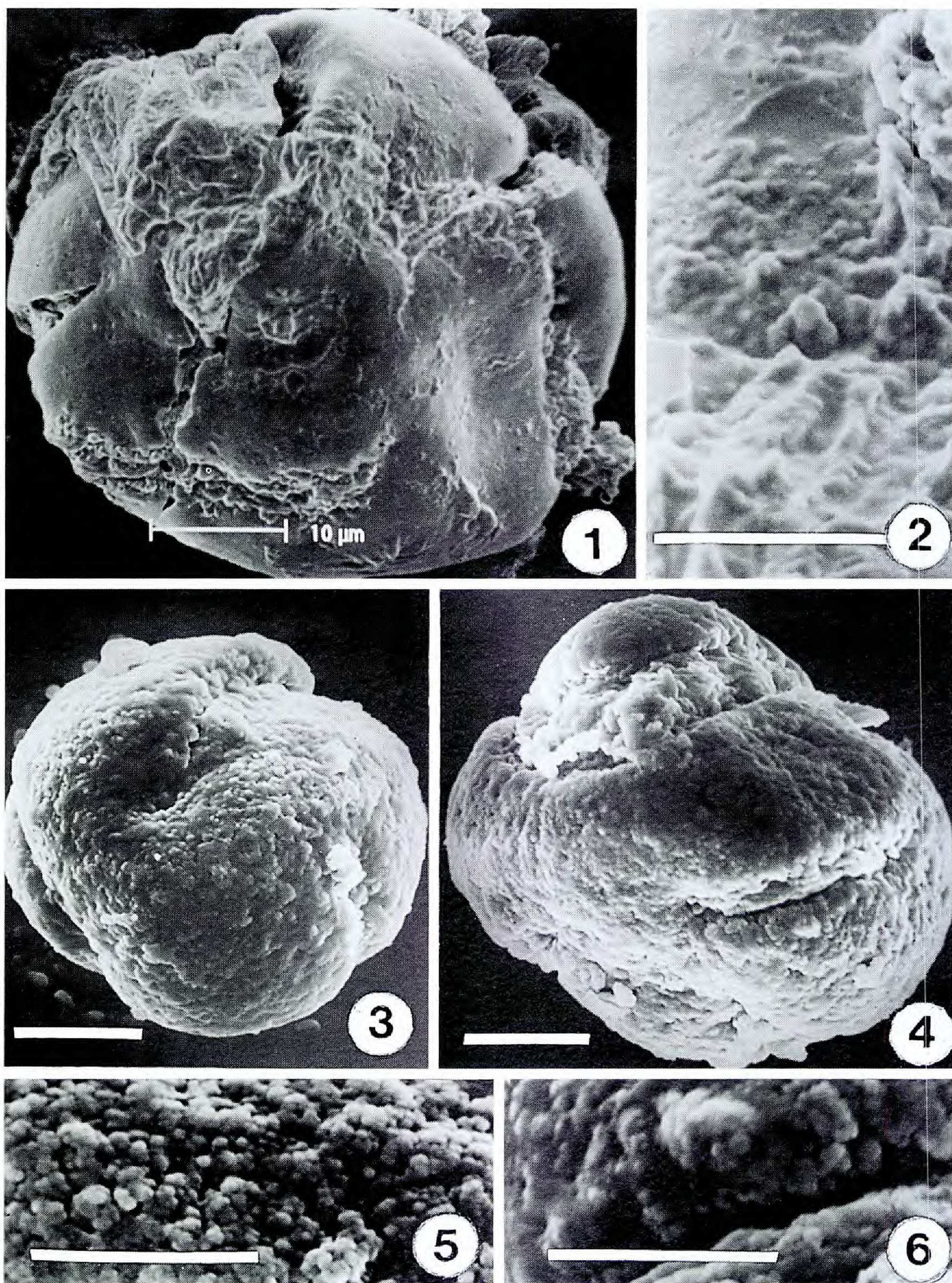
Grains spiraperturate, spiral twines irregularly delineating the surface into elongated and rounded areas; aperture narrow, margin smooth. Exine 3 μm thick, ectoexine thicker than the endoexine, columella indistinct; surface coarse, organised into irregular raised lumps of piloid elements or warted. Grains spheroidal, diam 34/40 μm (32–42 μm). Tectum irregular.

KEY TO VARIETIES

1. Grains spheroidal; diam 34 μm ; surface with closely packed, homogenous piloid elements var. ***griffithiana***
1. Grains sub-spheroidal; 37 \times 40 μm ; surface warted var. ***pallida***

The pollen grains of *B. griffithiana* var. *griffithiana* and *B. griffithiana* var. *pallida* were found to be similar to each other but revealed considerable differences with those of *B. replicata* var. *dispar* in primary (apertural), secondary (exine ornamentation) and tertiary (exine strata, shape and size) characters (see Table 1). This supports the view of Husain et al. (*l. c.*) that *B. replicata* var. *dispar* is a distinct taxonomic entity and being closer to *B. replicata* in macro-morphological characters, should be kept as a variety under *B. replicata* and not be merged under *B. griffithiana* var. *pallida*.

Walker and Doyle (1975) phylogenetically classified pollen with respect to the number of apertures as (i) Inaperturate (ii) mono-aperturate (iii) di-aperturate (iv) tri-aperturate or (v) poly-aperturate with 4,5,6 apertures and aperture shape as (i) elongate, furrow like (ii) round, pore like (iii) encircling ring or band like. The pollen grains of *B. replicata* var. *dispar* are basically inaperturate, the primitive type whereas those of *B. griffithiana* are spiraperturate (encircling the grain), the advanced type. Hence, *B. replicata* is considered primitive and *B. griffithiana* advanced. The two taxa represent the two extreme ends of the evolutionary status and thus strongly support the distinct identity of these two taxa.



FIGS. 1–6 Scanning electron micrographs of pollen.

FIGS. 1–2. *Berberis replicata* var. *dispar*, 1) surface with cracks and fissures. 2) surface enlarged showing irregular folds.

FIGS. 3–6. *Berberis griffithiana*, 3) pollen with semi-spiral. 5) surface with piloid elements. 4,6) var. *pallida*, 4) pollen with one free colpus. 6) warted surface.

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